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Prolonging the Life of Farm Timbers

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PROLONGING THE LIFE OF FARM TIMBERS*

By Laurance Lee, M. F.

Investigation has shown that much of the wood used on the farms of New York State undergoes rapid decay which seriously affects its period of service. Especially does this apply where wood is used for fence posts, building foundations, silos, shingles, telephone poles, and allied purposes. It is quite impossible to state with any degree of accuracy the annual loss resulting from decay, but it is safe to assume that it runs into millions of board feet. Such waste is little short of criminal since it is easily preventable and entails enormous expenditures of money for replacements and repairs.

Some woods are naturally more resistant to decay than others. A fence post of cedar will outlast one of poplar by a number of years under identical conditions. But unfortunately, the supply of the more durable woods is rapidly decreasing. Wasteful exploitation has been allowed to go on unrestricted until the available supply of these naturally resistant woods has been well nigh exhausted, and it is only a question of time before the farmer will be dependent mainly on the less durable woods for farm timber. It follows that something must be done in the way of making such woods more resistant to decay, and hence more serviceable. It is the aim of this paper to show that it is within the means of the farmers of New York State to so treat their timber that its resistance to decay will outlast the mechanical wear.

What is Decay?

Fungi. The decay of wood is not due to the fermentation of sap, nor to the chemical action of the soil as is commonly supposed. Decay is brought about by the growth within the tissues of the wood of a very low form of plant known as a fungus.

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* Department of Wood Technology, New York State College of Forestry.

Fungi are fundamentally plants just as much as are trees and herbs. They differ only in their form and in their method of obtaining food. Trees and herbs possess a green pigment (chlorophyll) which enables them to manufacture organic food in the presence of light. Fungi lack this green coloring matter and are dependent for their food on other living or dead organisms.

A fungus consists of an entangled mass of many-branched, very fine, thread-like filaments known collectively as mycelium, which penetrate the wood cells in search of food. At various points the mycelium may grow out to the surface where it forms thick compact bodies commonly called "dog-ears," "brackets," "mushrooms," "toadstools," etc. These are the fruiting bodies of the fungus and bear millions of tiny propagative bodies known as spores, which serve to spread the plant. Fungal spores are microscopic in size and are carried great distances by the lighest air currents or by other agents. Should they perchance lodge on wood and the conditions for growth were favorable they germinate and send out hyphae (mycelium) into the woody tissue, which cause decay. In a very short time, a large, sound stick of timber may be rendered quite useless through infection resulting from a single spore. In addition to dissemination through spores, fungi may also spread from diseased to sound wood where timbers are in contact. Such infections result commonly in lumber which is improperly piled, where increased humidity results through restricted aeration; the mycelium from the decaying wood "grows," or spreads to the sound wood.

Practically all of the wood destroying fungi belong to a single class known as *Basidiomycetes,* a group which contains many species and includes in addition the common forms of edible mushrooms and the toadstools. It is of no especial significance to the farmer to be able to distinguish the various forms of wood destroying fungi, since the means of preventing their action is the same in all cases. They present an amazing variety of forms which require the attention of a specialist for their identification.

Work of Fungi. The mycelium of the fungus penetrates the cells of the wood in search of food which is obtained chiefly through the disintegration of the cell walls. In extracting this food the fungus excretes juices or plant ferments known as enzymes which leach out in advance of the mycelium and have a solvent action on the cell wall substance. Disintegration and dissolution of the wood eventually results leaving behind the punky, powdery residue which is characteristic of decayed wood.

Point of Attack. Wood in contact with the soil is most susceptible to decay. Here all the conditions are favorable for the growth of fungi, especially in climates such as that of the greater part of New York State where there is sufficient rainfall to keep the ground damp a greater part of the growing season. Wood which rests on the ground or partly in the ground, such as posts, poles, sills, etc., is more subject to rapid decay than when used elsewhere. Timber free from contact with the ground or with other timbers is less susceptible to attack, although decay may start if dust and moisture are permitted to collect on the surface.

Factors of Decay. There are four governing factors which are inseparably concerned with fungal growth, namely, air, food, moisture in proper amount, and a favorable temperature. If any one of these factors is rendered impotent, or kept below an optimum, fungal growth is thereby and in direct proportion prevented or greatly inhibited, and it follows that decay can be prevented by controlling one or more of these factors. It is obvious that we cannot eliminate the air-supply factor. The moisture factor may be controlled to some extent where timber is used indoors, but inasmuch as most of the timber used on the farm is exposed to the elements, it is not feasible to attempt to prevent decay in this way. Rejecting the temperature factor as promising no means of solution, the problem of the control of fungal growth in wood rests on a method of poisoning the wood and hence the food supply of the fungus.

Other Agents That Destroy Wood

In addition to decay there are other agents which are active in the destruction of wood, chief among which are insects. In the southern states and in tropical countries, serious damage results from the activities of "white ants" or termites, although in New York State, except along the southern boundary, there is little danger from this source. The large black ants known as "carpenter ants" occasionally infect and seriously weaken barn timbers, but as a rule, confine their activities to unconverted timber.

From the standpoint of wood deterioration, the most important insects of interest to the farmers of this State are tiny beetles known as powder-post beetles. These little insects make long gallaries or tunnels in wood, which they fill with the refuse from boring, and cause depreciation in ax helves, shovel handles, whiffletrees, etc., particularly when they are not in active use. If they are permitted to work in the wood for a long time, it becomes so badly perforated as to cause it to fail in service. Powder-post beetles prefer to mine in dry material which has been stored pending subsequent usage. Trouble from this source can be prevented by avoiding the storage of wood (handles and the like) over long periods.

Natural Durability of Woods

A knowledge of the inherent tendency of certain woods to resist decay is of prime importance in wood preservation as it does not pay to treat the more durable woods. In Table I the woods used commonly on the farm are listed according to their relative durability.

TABLE I*

VERY DURABLE	DURABLE	SHORT LIVED
Walnut	Ash	Beech
Locust	Larch	Sycamore
Sequoia (redwood)	Yellow pine	Birch
Cedar	Spruce	Linden (basswood)
White oak	Fir	Cottonwood
Catalpa	Yellow poplar	White pine
Sassafras	Douglas fir	
Chestnut		
Long-leaf pine		

Those listed in the first column as very durable render sufficient service without treatment. The usefulness of those in the second column is sufficiently increased by preservation treatment to justify the extra expense. The "short-lived" woods require treatment for satisfactory service.

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* Compiled by Dr. H. von Schrenk.

How to Prevent Decay

PREPARATION OF TIMBER

Cutting and Peeling. Wood which is to undergo preservative treatment should be free from bark, as the corky nature of this renders it well nigh impervious to preservatives. It follows that shaped timber and lumber is cleared of bark at the mill by slabbing, but round or hewn timber should be peeled by hand immediately after felling. This is best done in the late spring, since the bark can be easily removed only at that time. This does not entail additional expense or labor, because logs which are left in the woods for a period and not immediately sawn should be peeled to hasten seasoning and to prevent fungi and insects from obtaining a foothold.

Seasoning. Wood obtained from the living trees contains a large amount of water which is held in part free in the cell cavities and in part in saturated cell walls. The water content may be as high as 200%,* but varies with the kind of wood, condition of growth, and time of cutting. As soon as a tree is felled, the wood begins to lose weight owing to evaporation of this water, a process known as "seasoning." When seasoned by exposure to the atmosphere, wood is said to be air-dried; when seasoned by artificial means, it is said to be oven, or kiln-dried. Air-dry material is the most economical and is entirely satisfactory for use on the farm. The primary objects of seasoning may be tabulated briefly as follows:

1. To prevent injury by insects and fungi before the wood is put into service.
2. To prevent checking and shrinking after the wood is in service.
3. To reduce weight.
4. To increase the mechanical strength.
5. To prepare the wood for treatment with preservative.

In seasoning care should be taken to see that each individual piece of wood gets a thorough circulation of air. Lumber should never be piled flat, one piece upon another, but each piece should be separated from the other by thin strips (stickers) as in B, Fig. 1. The "log cabin" method of piling, especially for fence posts (A, Fig. 1), will also insure a good circulation of air and thorough seasoning.

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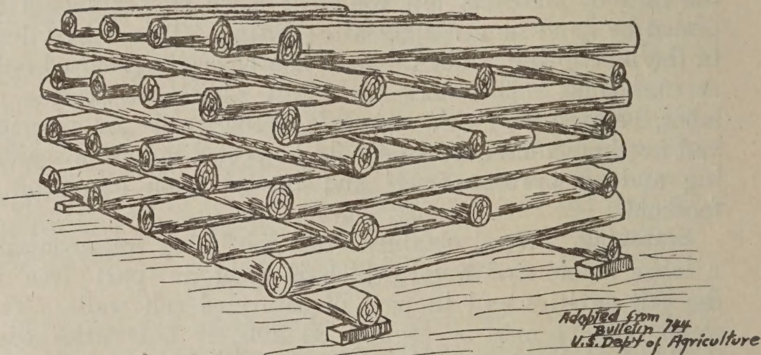
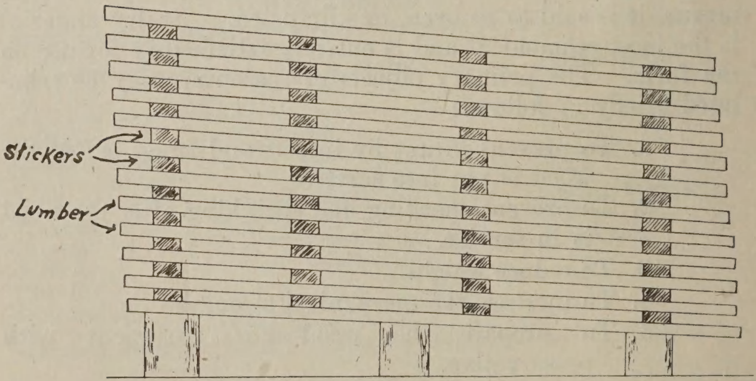
* Tiemann, H. D. The Kiln Drying of Lumber, p. 105.

Figure 1.



Adapted from Bulletin 744 U.S. Dep't of Agriculture

A. "Log Cabin" Style of Piling for Seasoning Posts and Round Timber.



B. Lumber Piled for Seasoning.

Explanation in text.

Shaping and Cutting. Timber to be treated should be cut to size and shape, all mortises and tennons made in advance, and all boring and framing completed before treatment. If timber is cut or shaped after it has been treated, the untreated surface will be exposed and as much damage may result as though the wood had not been treated. If it is found necessary to cut timber after treatment, the exposed surface should be given two brush coats of a strong solution of the preservative used in the original treatment.

PRESERVATIVE MEASURES

Without the Use of Chemicals. As pointed out on page 5, dry wood will not decay inasmuch as fungi require moisture for growth. This dry condition is attained in furniture, doors, interior trim, etc., by kiln drying and subsequent protection from the elements by oils and varnishes.* Where wood is exposed to moisture as out of doors about stables or pens, other methods must be employed to insure preservation.

Charring the butts of posts and poles will prevent decay temporarily because the surface is coated with carbon which retards decay, but in charring, the outer wood fibers are destroyed or weakened. In addition, the carbon will wear off eventually and expose the sound wood to new infection.

Another method of protecting posts and poles is to set them in crushed stone or concrete. This is efficient for a short time, but in comparison to the financial outlay and the increased durability, is inadvisable except where metal is used.

Use of Chemical Preservatives. The chief aims of chemical preservative are either to poison the food of the encroaching organism or to waterproof the surface, thus protecting the wood from the moisture necessary for the fungal growth. Greater efficiency in treatment accrues where both conditions are satisfied by a single preservative.

Waterproofing consists in merely coating the surface of the wood with some chemical like petroleum, linseed oil, whale oil, or some other oily substance which will prevent the entrance of moisture into the wood, and is only temporary. The coating soon wears off, again exposing the wood to decay.

The most satisfactory preservatives are those which poison the wood and hence the food supply of the fungus. Such chemicals or combinations thereof are called toxic preservatives. In addition to its toxic properties an efficient preservative should meet the following specifications:

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* Wood used in the manufacture of furniture is not "absolutely" dry nor will varnishes insure an unvarying moisture content. Furniture wood is generally too dry for fungal growth.

1. Ability to penetrate the wood to be treated.
2. Ability to remain in the wood after treatment.
3. Have no injurious effect on the mechanical properties of the wood.
4. Have no corroding action on material, especially metal, coming in contact with the treated wood.

Water Soluble Preservatives. A number of compounds known as water soluble preservatives are used on a large scale in commercial practice for treating wood. These water solubles are not advanced for use on the farm as they are difficult of application and require a more or less elaborate equipment. In a climate of heavy precipitation such as that of New York State such water soluble compounds leach out of the wood comparatively quickly and are, for this reason, ineffective.

Creosotes. The best preservative for use on the farm is creosote because of its cheapness, ease of application and permanency. Where this is used consistently, increased durability and service may be anticipated from farm timber.

The term "creosote" applies to an oil heavier than water derived from the destructive distillation of various tars. These tars are obtained as by-products from coal in the manufacture of coke, wood in the manufacture of pyroligenous acid, or charcoal and petroleum in the manufacture of water gas. The most common form used in wood preservation is obtained from coal-tar and is known as coal-tar creosote.

Coal-tar creosote may be obtained in several grades. Any good grade will give satisfactory results in farm use, but it is not desirable to employ the creosotes containing a high percentage of oils which boil at a low temperature, since these oils volatilize at low temperatures prevailing during treatment and subsequently lose a large part of their toxic value. In the better grades of oil such as are manufactured by companies expressly for the use of farmers, the amount of toxic value lost by volatilization is not sufficient to warrant the purchase of the higher priced, higher boiling oils. A list of companies that make a specialty of supplying a grade of creosote suitable for the treatment of farm timbers will be furnished upon application to the College. This is sold either in barrel lots or in smaller quantities and has a minimum volatilization per cent at a minimum cost. All companies are glad to furnish information to anyone interested as to the grades of oil most suitable for various purposes, the methods of use, prices, etc. Farmers so interested will find them willing cooperators in the preservation of farm timbers. Local hardware dealers also usually have on hand in small or large lots some form of creosote suitable for work on the farm.

Methods of Treatment With Creosote

SURFACE TREATING

Surface treating consists in coating the surface of the wood with a film of creosote oil and is effective so long as the treated material is not subject to abrasion, but where timber is subjected to severe mechanical wear, the preservative wears off and exposes the sound wood to decay. There are three methods of applying the surface treatment which are adaptable for use on farms, viz.: (1) Brush treating (2) dipping, and (3) spraying.

Brush Treating. Creosote oil is heated to near the boiling point (200°–220°F.). It is then flooded, rather than painted, over the surface of the wood, and worked in with a stiff, wire bound brush. All cracks and defects in the wood should be thoroughly saturated with the oil, and the first coat allowed to *dry completely* before another is applied.

The chief advantage of brush treating is its cheapness and simplicity. The only equipment necessary is a large metal vessel in which to heat the oil, a smaller vessel from which to paint and a long-handled brush to spread the oil over the wood. If a thermometer is available it can be used to good advantage in keeping the temperature constant. If no thermometer is used, the best method is to keep the oil hot, but not boiling.

The brush treatment is very effective for timber in small lots and joints and points of contact may be readily treated in this way where it would be difficult or impracticable by the more involved processes. Only timber which is dry on the surface and thoroughly seasoned should be treated in this way and treatment should be made during warm weather to avoid difficulty in keeping the oil hot.

Dipping. The dipping process consists in steeping the wood in oil at 200° to 220° F. for five to fifteen minutes or longer. This allows all cracks and defects to become filled with oil, but there is little or no penetration. The method is very effective in protecting the surface of the wood from decay and increased durability may be anticipated where the wood is not subject to abrasion. A large amount of material may be treated in this way with a small amount of oil.

Thoroughly peeled, dry timber should be used in dipping, and after treatment the material should be allowed to become thoroughly dry. The apparatus necessary consists of a suitable tank, some means of heating, and a thermometer to keep a constant temperature.

Spraying. This method has been used with very satisfactory results, especially for shaped timbers. The equipment necessary is a simple spraying device, with a special nozzle, similar to that used for spraying trees. Such a spraying outfit, consisting of oil-proof hose and special nozzle, designed for spraying ends and mortises of timber, joints and other points of contact may be procured from most brass manufacturing companies.* This may be used with a hand or power pump, costing approximately $16.00 and has given very good service.

IMPREGNATION TREATING

Open Tank Treatment. Impregnation treatment aims to actually force the preservative into the wood. The best method to achieve this result, within the means of the farmer is known as the open-tank treatment. The principle upon which this form of treatment depends is that of the expansion and contraction of air. The material to be treated is submerged in a tank of hot creosote. After remaining from 3–6 hours in this hot bath, depending upon the density and kind of wood, the material is taken out and either allowed to cool in the air, or is plunged into a bath of cool (warmed) creosote. The hot bath drives out some of the moisture from the wood and causes the air in the cells to expand. The cool bath causes the air to contract thus producing a partial vacuum which draws some of the creosote oil into the wood. The temperature of the hot bath is kept as near constant as possible (180° to 220° F.); that of the cold bath should be approximately 100° F.

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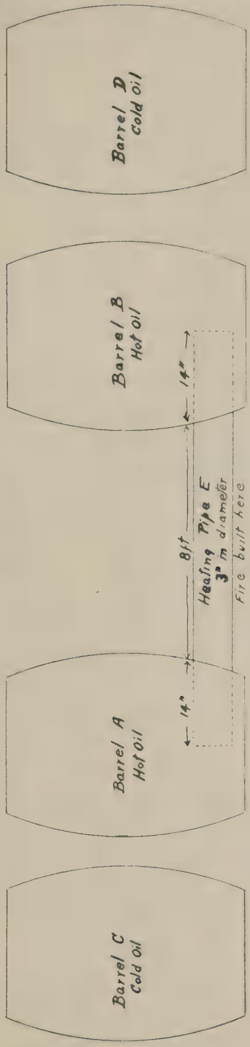
* A list of companies making a specialty of this spraying device will be furnished upon application to the college.

Apparatus for Open Tank Treatment. The essential equipment for open-tank treatment is comparatively simple. One

FIGURE 2.



Oil Barrel Type of Treating Plant

or two tanks, a thermometer and some means of heating the oil are the only requisites. The tank or tanks (1) should not leak, (2) should be strong enough to allow plenty of room for the oil during treatment without slopping over, and (3) should be easy to heat. Any tank which fulfills the above requirements will answer the purpose. Care should be taken when heating the tank by an open fire to prevent the oil from catching fire. Treatment should be made at a safe distance from all buildings as an additional safeguard. Figure 2 shows an open tank plant which may be made from oil or tar barrels.

Heat is supplied to barrels A and B by a fire built under the 3-inch iron pipe E. The latter should be threaded 2½ inches from the end and provided with flanges with heavy asbestos packing. A hole is bored in the barrels to adjust the pipe, the gaskets are inserted from the inside and the flanges then screwed up tight.

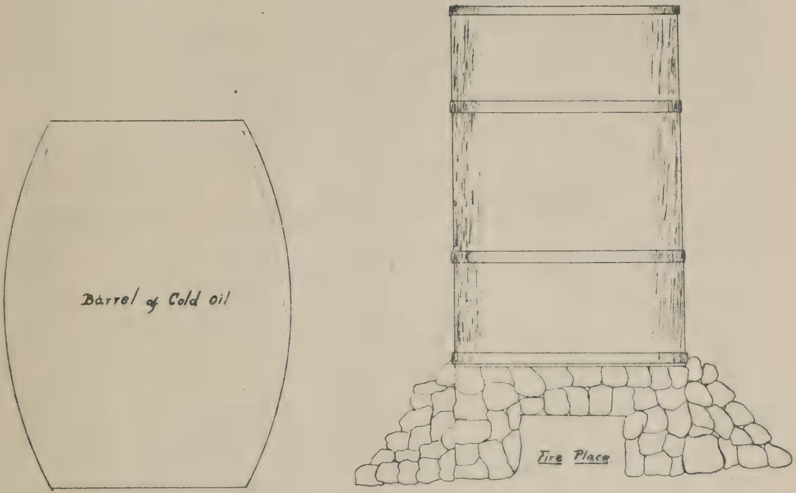
In treating, the barrels C and D are filled with the cold oil. The material is first submerged in tanks A and B and then transferred to tanks C and D, and allowed to soak. This type of treating plant is best adapted for treating posts and a fair amount of success has been obtained by its use. The chief disadvantage lies in the fact that it is very difficult to control the heat, but it is cheap and, with proper attention, reasonably efficient.

Figure 3 shows a treating outfit made from an ordinary oil drum by removing one head. Tank A is set over a fire pit and contains the oil which is to be heated while the cold oil is kept in tank B. Treatment is identical to that employed in the barrel-type system. While the creosote oil may be heated more quickly by this method, it is more difficult to maintain an even temperature. The heat can be more readily controlled by being directly under the tank.

In figure 4 a rather elaborate type of treating plant intended for permanent use is shown. This consists of a brick fire-box constructed under an iron tank A which in turn is nearly encased by a layer of brick. Draught is provided by the chimney pipe B. The brick casing ensures a thorough and uniform heating of the contents of tank A. An ordinary barrel or tank will suffice for the cold bath.

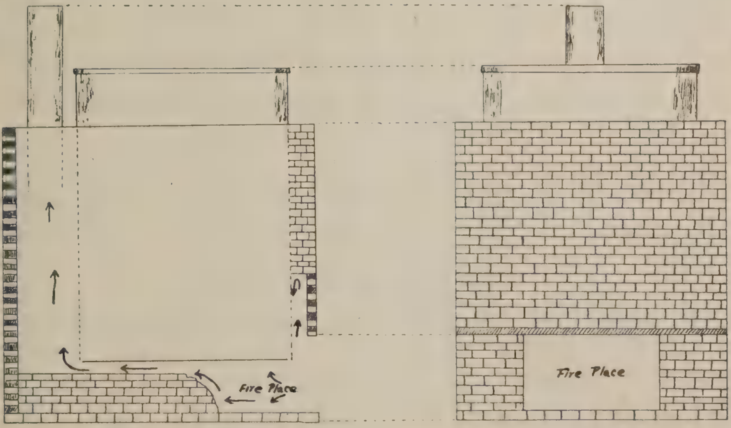
The details of a portable open plant outfit suitable for community treating are shown in Figure 5. Heat may be furnished by steam from a boiler used with a steam threshing machine or traction engine. The tank is made of wood lined with galvanized iron or zinc and is adaptable for

FIGURE 3.



Oil Drum Treating Plant.

FIGURE 4.



Side View

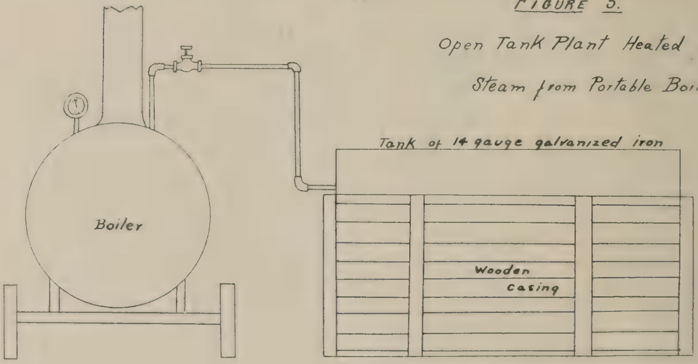
Front View

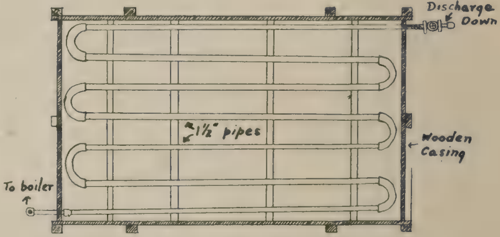
Iron Tank with Brick Firebox

treating material of various shapes. A steam coil is placed on the bottom and is connected to the steam pipe from the boiler. In fitting this coil care should be taken to see that all joints are leak proof and the pipe of best quality.* A cold bath may be provided by constructing a second tank similar to that used in the hot treatment except for the steam coils. This system is highly efficient and treating can be done at a fairly reasonable rate after the original outlay for equipment. For community work it is strongly advocated.

Figure 5.

Open Tank Plant Heated by Steam from Portable Boiler.





Detail of Steam Coil Construction.

Note: For treating posts, a round, deep tank may be substituted for the horizontal.

Description in Text

SELECTION OF EQUIPMENT

In general the selection of the proper equipment for preservative treatment depends on the amount and kind of material to be treated and the financial outlay justified. Where the material consists only of fence posts and round timber, some form of the barrel type will suffice because of its simplicity and cheapness. Where lumber is to be treated, one of the surface treatment methods will ordinarily give satisfactory results. In case both lumber and round timbers are to be treated, a combination of the barrel type and surface treating is suggested. The chief aim always should be to keep the expense of treating proportionate to the saving brought about by the increase in the durability of the material.

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* The best substance for sealing pipe joints and elbows is a good grade of red lead paint. This should be allowed to harden thoroughly before attempting to use the tank as the toxic value of the oil is impaired by steam leakage.

METHOD OF OPEN-TANK TREATMENT

The material to be treated is submerged in the bath of hot creosote. The oil is heated to 180° to 220° F. and kept as near constant as possible. A good thermometer is a great aid in regulating the temperature. The material is kept in this hot bath for at least one hour, but a longer time will give better results.

The material is then transferred to the cold bath and allowed to soak for from two to four hours, after which it should be thoroughly dried. This drying usually takes from two to three days, and the timber is then ready for use.

Where the material is allowed to cool in air instead of using the cold bath, it is well to alternate the cooling with additional periods in the hot bath. This will insure a better absorption and more even penetration. In any case one should bear in mind that the treatment should not be hurried or pushed. The longer and slower the process the more satisfactory will be the results.

Resistance of Woods to Injection of Creosote

A factor of considerable importance in treating timber is the resistance of certain woods to the injection of creosote. Some woods absorb the cresote readily while others are very difficult to treat successfully. In the following table the relative resistance to penetration of the more common woods is shown in tabulated form. Those woods enumerated in Classes II and III require a longer treatment than those of Class I.

TABLE 2 *

RESISTANCE OF WOODS TO THE INJECTION OF CREOSOTE

CLASS I *Least Resistant* Sapwood of all commercial species and both sap and heart of the list below.	CLASS II *Medium Resistant* Both heartwood and sapwood of list below.	CLASS III *Greatest Resistance*
Black ash	White ash	White oak
Beech	Basswood	White cedar
Birch	Butternut	Red cedar
Box elder	Chestnut	Yellow cedar
Catalpa	Dogwood	Douglas fir
Loblolly pine	Elm	Hemlock
Long-leaf pine	Balsam fir	Tamarack
White pine	White fir	Dense yellow pine
Yellow poplar	Hackberry	Redwood
Sycamore	Hickory	Spruce
Cottonwood	Hard maple	
Ironwood	Black oak	
Red maple		
Silver maple		
Jack pine		
Short-leaf pine		
Sugar pine		
Western (white) pine		
Sassafras		
Willow		

Economy of Treatment

Cost. The obvious question that occurs to the farmer in the matter of preserving his timbers is " how much is it going to cost ? " This is a very fair question and deserves consideration, as the crucial test in justifying wood preservation on the farm is that of economy. In other words, the cost of operation should be proportionate to the increase in durability of the material treated. Justification of the treatment involves an actual money saving above the cost of treating.

In figuring the cost of treating three factors must be considered, (1) cost of labor, (2) cost of chemicals, and (3) cost of outfit, each of which may have an important bearing on the ultimate expense. Labor is so uncertain that it is impossible to give accurate figures and an estimate of this is best left with one conversant with local conditions. Inasmuch as the operations connected with the treatment of farm timbers are largely mechanical, unskilled labor may be advantageously employed with a resultant lowering of expense. Some idea of the cost of chemicals may be deduced from table 3 which shows the cost of treating 100 square feet of surface of lumber of different thickness with creosote at 65 cents per gallon. It must be understood, however, that this figure is subject to change like that of other commodities at the present time.

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* From K. C. Barth, The Barrett Manufacturing Co.

TABLE 3 *

THICKNESS OF LUMBER	QUANTITY OF OIL REQUIRED	COST
1 inch	1 gallon	$0 65
2 inches	1⅓ gallons	87
3 inches	1⅔ gallons	1 09
4 inches	2 gallons	1 30
5 inches	2⅓ gallons	1 55
6 inches	2⅔ gallons	1 74
7 inches	3 gallons	1 95
8 inches	3⅓ gallons	2 17
9 inches	3⅔ gallons	2 39
10 inches	4 gallons	2 60
11 inches	4⅓ gallons	2 82
12 inches	4⅔ gallons	3 04

The cost of the treating oufit varies with the size. In the simple brush treatment no outlay is necessary, as the vessels for heating and painting are usually available about a farm, and an old broom will answer for a brush. A barrel type of plant such as shown in figure 2 can be made for a few dollars. Oil or tar barrels give satisfactory service and these may often be obtained at a nominal cost where " state roads " are in process of resurfacing or repair. Oil drums of one hundred gallons capacity, of the type indicated in figure 3, are obtainable from oil companies at a price of about two dollars, and a serviceable treating plant may be made from them with little expense. The more elaborate treatment outfits run to twenty dollars and upward.

The saving in money by preservative measures is evidenced in the increased life of the treated material. If through

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* From K. C. Barth.

treating, the life of the material is increased in proportion to the cost of replacement, a saving will result. If the cost of one treated piece is *less* than two untreated pieces, then a saving is assured.

The above can best be illustrated by figures obtained from tests made on fence posts, a form of farm timber prone to rapid decay. A post treated and set in position will cost approximately 30 cents with present cost of creosote at 65 cents per gallon, and reasonable charges for labor. An untreated post under the same conditions costs about 20 cents. The treated post will last approximately 20 to 30 years, while the life of the untreated post varies between 6 and 8 years. Considering the lowest figure for the treated post, that is, 20 years, and the highest for the untreated post, 8 years, preservative treatment increases the life of a post at least 12 years. That is, the treated post will last more than the length of life of two untreated posts; or one treated post costs 30 cents and two untreated posts costs 40 cents. There is a saving at a conservative estimate of 10 cents clear per post, or $10 for 100 posts, to say nothing of the labor cost of replacement.

Fire Hazard of Creosoted Timber

There has been some hesitation in advocating the use of creosoted wood in farm buildings because of the supposed danger from fire. In order to obtain definite data as to the fire hazard of creosoted timber, tests were conducted by the U. S. Forest Products Laboratory at Madison, Wisconsin, and others elsewhere, to determine the inflammability of creosoted material. The wood used in these experiments was treated under varying conditions for different periods. The results indicated that freshly treated wood is highly inflammable on account of the presence of certain combustible gases which are given off by creosote, but as the wood seasons, there is a marked reduction in its inflammability. After six months creosoted wood was found to be less inflammable than untreated wood. This discrepancy undoubtedly results from the fact that the creosote oils contain compounds requiring fairly high temperatures for ignition, but as these evaporate the temperature needed to flash the heavier oils is correspondingly increased.

In connection with the above, an interesting phenomenon is to be noted. When a creosoted stick burns, a considerable amount of heavy, sooty smoke is given off, while the actual charring of wood is surprisingly small. The apparent explanation of this lies in the fact that the flame is fed by oil from the inside after the manner of a wick. The wood itself is not burned, but rather, the oil from the wood.

In conclusion, the general inference may be drawn that with proper seasoning after treatment the fire hazard of creosoted wood is actually decreased. Furthermore, should the wood itself ignite, it is but slightly damaged provided the flames are extinguished with reasonable dispatch.

Contamination of Ensilage From Creosote

The question has been raised as to the possibility of contamination of silage from creosoted timber when in silo construction. Exacting tests have been carried by the U. S. Forest Products Laboratory at Madison, Wisconsin to determine whether or not actual contamination results. Creosoted wood was buried in silage for a given period and the ensilage then used as fodder. While the cattle evidently did not relish the tainted fodder, no ill effects were noted. The conditions of the test were unusually severe and comparable in no way to those resulting from preservative treatment of silo timber. Further tests are now being carried out with actual silo construction, and indications point to the fact that with proper seasoning of the wood after treatment, no evil effects will result from treating silo material with creosote. Additional experiments are now under way which will undoubtedly demonstrate the value of wood preservation in silo construction.

Summary

1. Preservative treatment of farm timbers is beyond doubt a "live" question to the farmers of New York State. It means an actual money saving not only to the individual but to the State. The methods of efficient preservation are simple and well within the means of every farmer.

2. Community preserving of farm timber is strongly advocated. The efficient treatment of wood can be accomplished by this means at a reasonable rate.

3. The rapidly decreasing supply of our commercial woods and the crying needs for conservation, demand the interest of all users of wood. The earnest cooperation of the farmer is essential and The New York State College of Forestry is prepared to offer the services of its technical staff in advising farmers in the treatment of timber.